

Application Ser. No. 10/605,638
Filed: 10/15/2003

Inventor: RAHMAN, Anis
Attorney Docket No. 23634-0001-UI

APPENDIX A

Claims Marked Up

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 Attorney Docket No. 23634-0001-U1

22. ~~[Previously presented]~~ The photonic integrated circuit as set forth in claim 11 wherein the predetermined channel frequency is selected from the group consisting of about 30 GHz, and 50 GHz, 100 GHz, 200 GHz, 300 GHz, and 624 GHz.

44. [NEW]
 23. ~~[Previously presented]~~ A second-phase photonic integrated circuit comprising
 a photonic integrated circuit, the photonic integrated circuit comprising:

an input/output interface arranged on a substrate comprising a plurality of waveguides for simultaneously inputting at least one signal to and outputting at least one signal from the photonic integrated circuit for demultiplexing a multiplexed optical signal in to n different constituent wavelengths and for combining n input optical signals composed of n different constituent wavelengths in to a multiplexed signal;

a slab waveguide arranged on the substrate having a first end and a second end, the first end coupled to the plurality of waveguides of the input/output interface to focus the at least one input signal to the second end, and the second end coupled to the array of waveguides an array waveguide, for focusing the at least one output signal to the input/output interface through the first end;

~~an~~ the array waveguide arranged on the substrate comprising a plurality of waveguides for coupling the one or more input signals, separating the one or more input signals into the n different constituent wavelengths and focusing the n different constituent wavelengths back on to the slab waveguide first end coupling to the input/output interface, the plurality of waveguides of the array waveguide being optically coupled at one end with the second end of the slab waveguide, and terminated at the opposing end by the an opposing end of the array waveguide by a reflective mirror, each waveguide of said plurality of arrayed waveguides array waveguide having a predetermined path difference between successive waveguides; and

the reflective a-reflective mirror integrally disposed and formed along an edge of the integrated circuit at the opposing end of the array waveguide for reflecting the one or more signals incident on it from the array waveguide back into the array waveguide;

and an active unit formed on the substrate, the active unit connected to the photonic integrated circuit by a waveguide interconnect means;

24. ~~[Currently presented]~~ The second phase photonic integrated circuit as set forth in claim 23, wherein the active unit is a waveguide amplifier block, and the waveguide amplifier block is configured for connecting connection to an external pump laser ~~the waveguide amplifier block through a waveguide interconnect~~

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~~85. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 23, wherein the active unit is selected from the group consisting of laser diodes, VCSELs, detector arrays and electro-optic modulators, receiver, transmitters, waveguides and transducers.~~

~~26. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 23, wherein the amplifier block is comprised of a material that absorbs light in the 890 nanometer and the 1480 nanometer regions and emits light in the 1310 nanometer and 1550 nanometer regions.~~

45 [NEW]

~~27. [Previously presented] The second phase photonic integrated circuit as set forth in claim 23 wherein the amplifier block material is selected from one of the following: erbium doped dendrimer or glass.~~

~~30. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 23, also comprising a signal processing unit coupled to the photonic integrated circuit for electro-optically processing the input and output signals.~~

~~31. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 23, wherein the signal processing unit is a modulator block.~~

~~36. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 29 also having an external connecting means for interconnecting the modulator block to an external optical device.~~

~~37. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 29 wherein the modulator block comprises a plurality of n electro-optical elements.~~

~~32. [Currently amended] The second phase amplified photonic integrated circuit as set forth in claim 29 wherein the modulator block is connected to the photonic integrated circuit through a first waveguide interconnect, and the photonic integrated circuit is connected to the active unit are connected via through a second waveguide interconnect.~~

~~28. [Currently amended] The photonic integrated circuit as set forth in claim 11 wherein the photonic integrated circuit is fabricated by a monolithic means.~~

~~34. [Currently amended] The second phase photonic integrated circuit as set forth in claim 33-claim 23 wherein the photonic integrated circuit and the active unit are fabricated by a monolithic means.~~

~~35. [Currently Amended] The second phase photonic integrated circuit as set forth in claim 28 wherein the photonic integrated circuit, the active unit and the modulator block are fabricated by a monolithic means.~~

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~~22. [Previously presented] The photonic integrated circuit as in claim 1, wherein the predetermined channel frequency is selected from the group consisting of about 31 GHz, and 50 GHz, 100 GHz, 200 GHz, 500 GHz, and 624 GHz.~~

46. [NEW]

~~23. [Currently amended]~~

A second-phase photonic integrated circuit comprising

a photonic integrated circuit, the photonic integrated circuit comprising:

an input/output interface arranged on a substrate comprising a plurality of waveguides for simultaneously inputting at least one signal to and outputting at least one signal from the photonic integrated circuit for demultiplexing a multiplexed optical signal in to n different constituent wavelengths and for combining n input optical signals composed of n different constituent wavelengths in to a multiplexed signal;

a slab waveguide arranged on the substrate having a first end and a second end, the first end coupled to the plurality of waveguides of the input/output interface to focus the at least one input signal to the second end, and the second end coupled to the array of waveguides an array waveguide, for focusing the at least one output signal to the input/output interface through the first end;

an array waveguide arranged on the substrate comprising a plurality of waveguides for coupling the one or more input signals, separating the one or more input signals into the n different constituent wavelengths and focusing the n different constituent wavelengths back on to the slab waveguide first end coupling to the input/output interface, the plurality of waveguides of the array waveguide being optically coupled at one end with the second end of the slab waveguide, and terminated at the opposing end by the an opposing end of the array waveguide by a reflective mirror, each waveguide of said plurality of arrayed waveguides array waveguide having a predetermined path difference between successive waveguides; and

the reflective a reflective mirror integrally disposed and formed along an edge of the integrated circuit at the opposing end of the array waveguide for reflecting the one or more signals incident on it from the array waveguide back into the array waveguide;

and an active unit formed on the substrate, the active unit connected to the photonic integrated circuit by a waveguide interconnect means;

~~24. [Currently amended] The second-phase photonic integrated circuit as in claim 23, wherein the active unit is a waveguide amplifier block, and the waveguide amplifier block is configured for connecting connection to an external pump laser with the waveguide amplifier block through a first wave guide interconnect.~~

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- ~~25. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 23, wherein the active unit is selected from the group consisting of laser diodes, VCSELS, detector arrays and electro-optic modulators, receiver, transmitter, transceivers, and transponders.~~
26. [Previously presented] The second-phase amplified photonic integrated circuit as set forth in claim 23, wherein the amplifier block is comprised of a material that absorbs light in the 890 nanometer and the 1480 nanometer regions and emits light in the 1310 nanometer and 1550 nanometer regions.
27. [Previously presented] The second-phase photonic integrated circuit as set forth in claim 26 wherein the amplifier block material is selected from one of the following:
~~erbium doped dextrin or glass.~~
- ~~28. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 23, also comprising a signal processing unit coupled to the photonic integrated circuit for electro-optically processing the input and output signals.~~
29. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 28, wherein the signal processing unit is a modulator block.
- ~~30. [Previously presented] The second phase amplified photonic integrated circuit as set forth in claim 29 also having an external connecting means for interconnecting the modulator block to an external optical device.~~
31. [Previously presented] The second-phase amplified photonic integrated circuit as set forth in claim 29 wherein the modulator block comprises a plurality of n electro-optical elements.
32. [Currently amended] The second phase amplified photonic integrated circuit as set forth in claim 29 wherein the modulator block is connected to the photonic integrated circuit through a first waveguide interconnect, and the photonic integrated circuit is connected to the active unit through a second waveguide interconnect.
- ~~33. [Currently amended] The photonic integrated circuit as set forth in claim 11 wherein the photonic integrated circuit is fabricated by a monolithic means.~~
34. [Currently amended] The second phase photonic integrated circuit as set forth in claim 33-claim 23 wherein the photonic integrated circuit and the active unit are fabricated by a monolithic means.
35. [Currently Amended] The second phase photonic integrated circuit as set forth in claim 28 wherein the photonic integrated circuit, the active unit and the modulator block signal processing unit are fabricated by a monolithic means.